Meta-Lax Stress Relief Process

Meta-Lax Stress Relief Method Eliminates Pollution and Reduces Fuel Consumption

Operations such as machining and casting can introduce stresses that degrade product performance. Stress relief by heat treatment prevents distortion and crack propagation. Heat-treating requirements contribute to higher production and energy costs.

With help from the Department of Energy's Inventions and Innovation Program, Bonal Technologies, Inc. developed the Meta-Lax process that applies subresonant vibrational energy to relieve stress in metal objects. The process is particularly effective with welded structures and can be applied during or after welding. Meta-Lax equipment is portable and yields results much faster than conventional, unmovable heat-treating furnaces (30-minute average compared with 6 hours for a furnace).

Benefits

Energy Savings
Vibrational stress relief reduces energy consumption by 98% compared with a natural-gas-fired heat-treating furnace.

Material Savings
Raw material is saved though increased fatigue life (5% to 300%) and reduced scrap rate (50% to 100%).

Pollution Control
Pollution-free operation.

Productivity
Requires 98% less time for stress relief. Reduces processing costs 95%. Fabrication time reduced 25%, milling time reduced 40%, grinding time reduced 50%.

Product Quality
Work-piece performance is comparable or better than parts that are stress relieved thermally. The process causes no degradation of mechanical properties, distortion, or scaling. With welding, finer, uniform grain structures are generated, giving higher ductility (up to 400%) and impact strength (up to 100%). Weld cracking is reduced by 95%; also, weld distortion and porosity are lowered. The need for postweld stress relief is eliminated.

Overview

- Commercialized in 1991
- 841 units operating in United States

Energy Savings
(Trillion Btu)

Cumulative through 2003	2003
136	18.5

Emissions Reductions
(Thousand Tons, 2003)

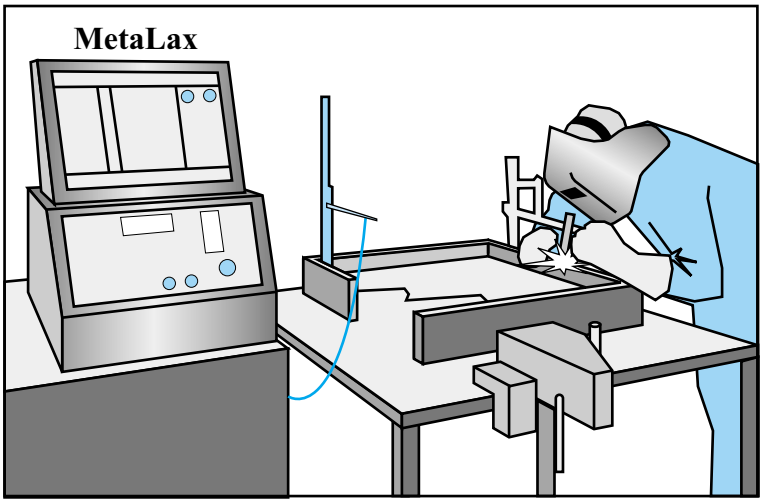
Particulates	SO_x	NO_x	Carbon
0.0	0.0	2.16	294

Applications

- Metal fabrication and machining industries; applicable to castings, forgings, weldments, and metal plates
- Stress relief of parts used in several industries such as automotive, aerospace, mining, defense, paper production, and shipbuilding

Capabilities

- Uses mild subharmonic vibrational energy to relieve stress, a proven substitute for 80% to 90% heat treating metalworking applications.
- Treats a wider variety of work pieces with versatile, portable unit.



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